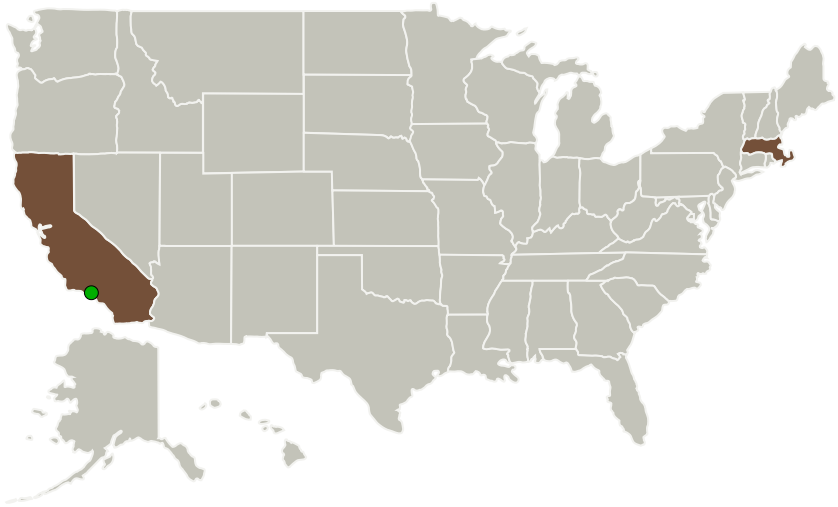
Precise Thrust Actuation by a Micro RF Ion Engine, Phase II

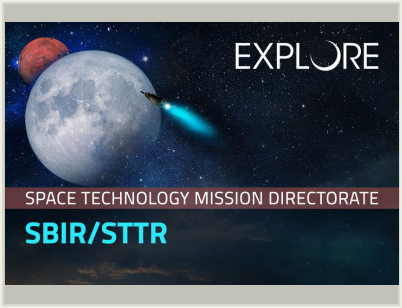
Completed Technology Project (2010 - 2012)

Project Introduction

The NASA Science Mission Directorate has plans to launch high-performance advanced space telescopes for astrophysics missions that require precision formation flying for synthetic aperture telescopes. These formations dictate the capability for precise alignment, synchronized maneuvers and reconfigurations. In order to accomplish the stated tasks, precise and low-noise micro-thrusters are needed. Busek Co. Inc. is proposing to continue the development of a micro RF ion engine propulsion system. Propulsion system is emphasized here because we believe we have all the building blocks needed to complete the system. The RF ion engine will operate in a dual thrust mode or low thrust, nominally 5-30 microNewtons (micro-N) for very precise, long duration missions and have the option to operate at high thrust, nominally 100 micro-N, for short applications such as spacecraft tip-off. This combination of thrust ranges from the same thruster is a unique and mission enabling technology. Busek has a flight qualified carbon nanotube field emission (CNTFE) cathode that is a near perfect fit for neutralizing the ion beam. The CNTFE is propellant-less and very low power, order of 1 Watt. Busek proposes to utilize a slightly modified microvalve for precise microflows. DC and RF electronics and control complete the system.

Primary U.S. Work Locations and Key Partners





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Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
Busek Company, Inc.	Lead Organization	Industry Women-Owned Small Business (WOSB)	Natick, Massachusetts
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Massachusetts

Project Transitions

January 2010: Project Start

January 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139344)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Busek Company, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

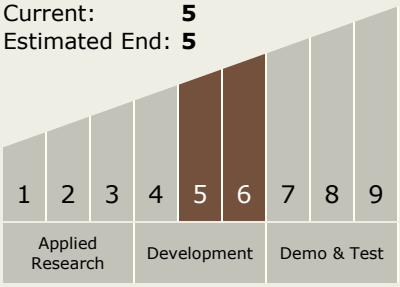
Carlos Torrez

Principal Investigator:

Kurt Hohman

Technology Maturity (TRL)

Start: **6**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.2 Electric Space Propulsion
    - TX01.2.2 Electrostatic

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System